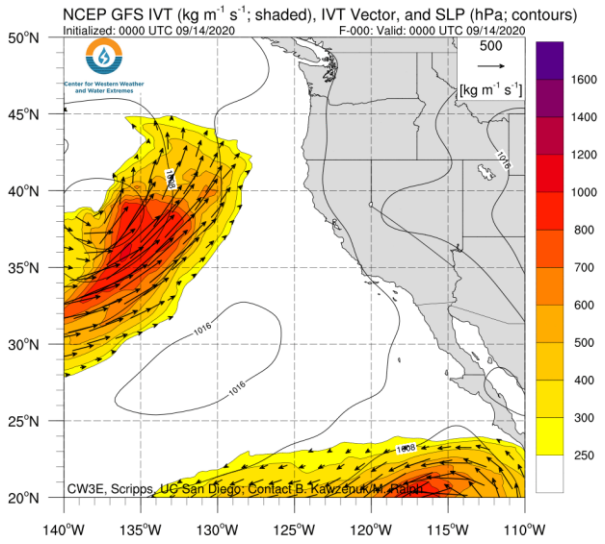
CW3E AR Outlook

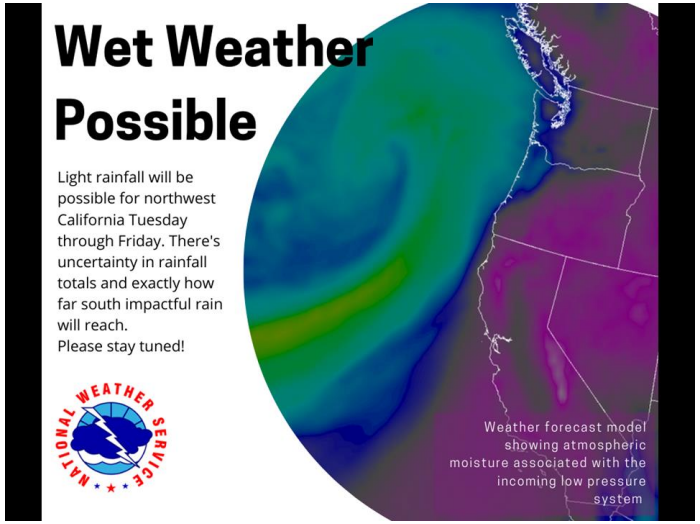
For California DWR's AR Program

Center for Western Weather and Water Extremes
SCRIPPS INSTITUTION OF OCEANOGRAPHY AT UC SAN DIEGO

Update on the Atmospheric River forecast to make landfall over the Pacific Northwest

- An AR that is forecast to make landfall over the next couple of days may bring much needed precipitation to Washington, Oregon, and potentially Northern California.
- As time has progressed closer to verification, ensemble agreement associated with AR landfall timing and initial IVT magnitude has increased.
- The parent low pressure system is forecast to cut off from the upper-level flow and become quasi-stationary off the PNW coast
- Forecast duration of the event is currently exhibiting larger uncertainties as the cut-off low remains off the coast and moves higher IVT magnitudes onshore.
- Forecast precipitation accumulations from the Weather Prediction Center have primarily decreased since our last outlook, though the ECMWF has trended towards a larger event (max. precip. accumulations of 1.5–2.4 in. over Coastal OR and WA).
- Forecasts continue to suggest that a majority of CA will remain dry with lighter precipitation rates over far Northern CA





Source: National Weather Service Eureka

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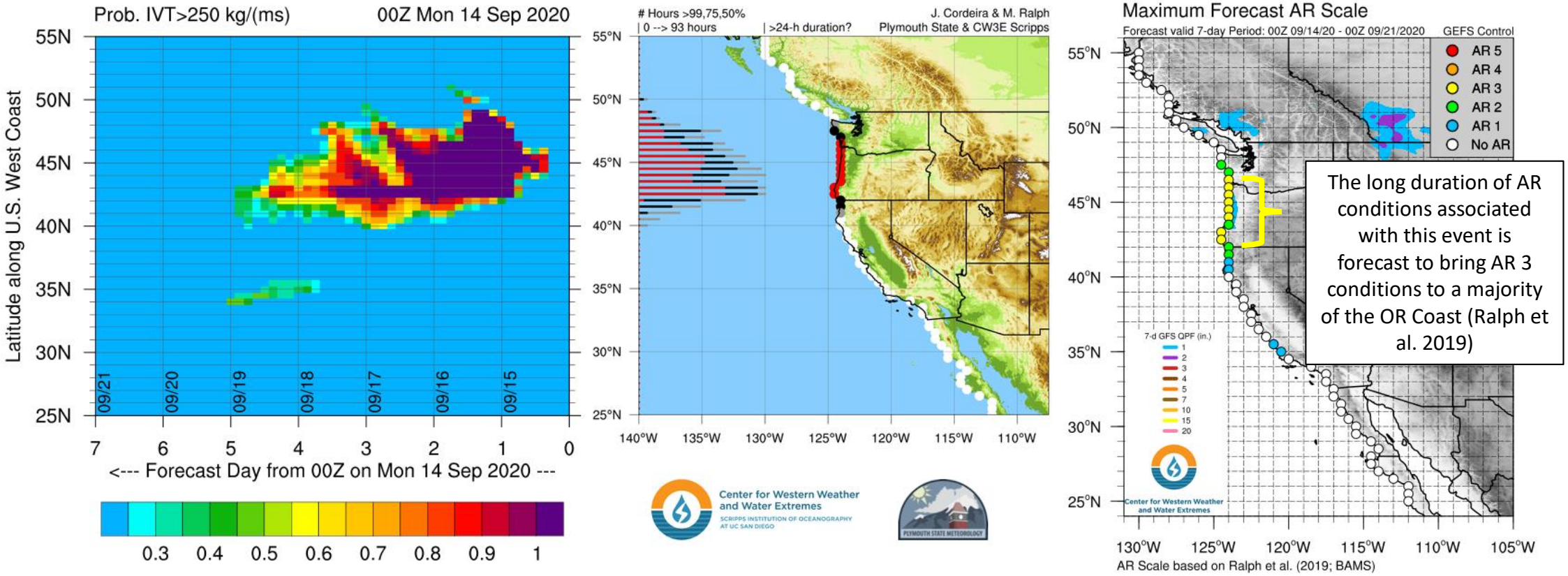
GEFS AR Landfall Probabilities & AR Scale (Coastal)

*GEFS = Global Ensemble Forecast System



The long duration of AR conditions associated with this event is forecast to bring AR 3 conditions to a majority of the OR Coast (Ralph et al. 2019)

- **The GEFS is exhibiting high ensemble probabilities (~100%) of AR conditions (IVT > 250 kg m^{-1} s^{-1}) from Coastal Washington to far Northern California spanning from ~12 UTC 14 Sep. through ~12 UTC 16 Sep. 2020**
- **As the parent low pressure system becomes cut off at ~00 UTC on 15 Sep., remnant moisture and IVT is forecast to continuously circulate around the semi-stagnant low, sporadically moving onshore over the PNW and potentially resulting in longer durations of AR conditions**
- **The ensemble probability of AR conditions associated with the cut-off low during the later stages of the event is currently lower (30–70%) when compared to the probabilities associated with initial AR landfall**

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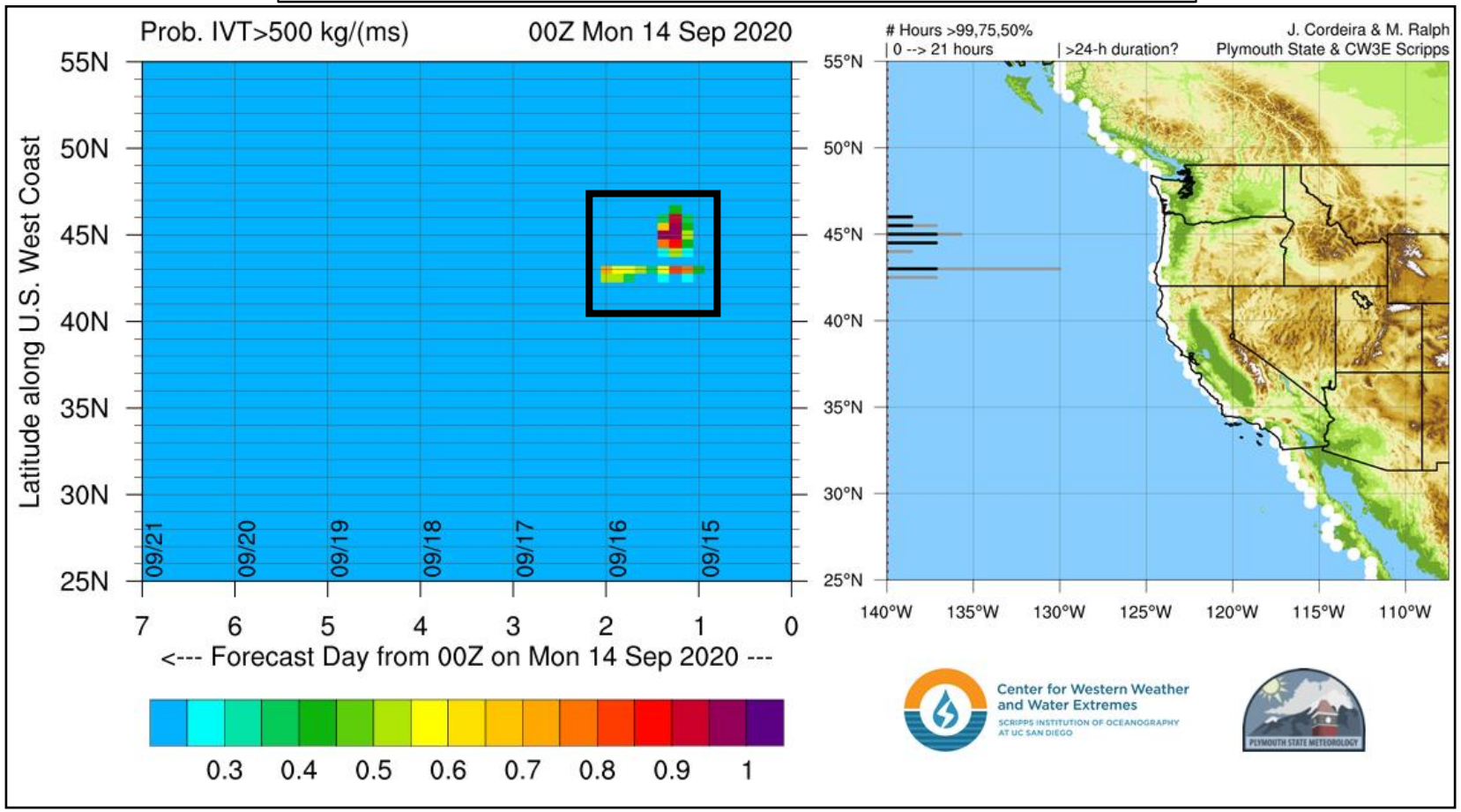
Probability of Moderate AR Conditions Along Coast



- **The GEFS is currently highlighting the potential for a brief period of moderate or greater strength AR conditions (>500 kg m^{-1} s^{-1}) on 15 September over Coastal OR**
- **The ECMWF EPS and GEFS are currently forecasting similar ensemble probabilities of moderate or greater AR conditions**

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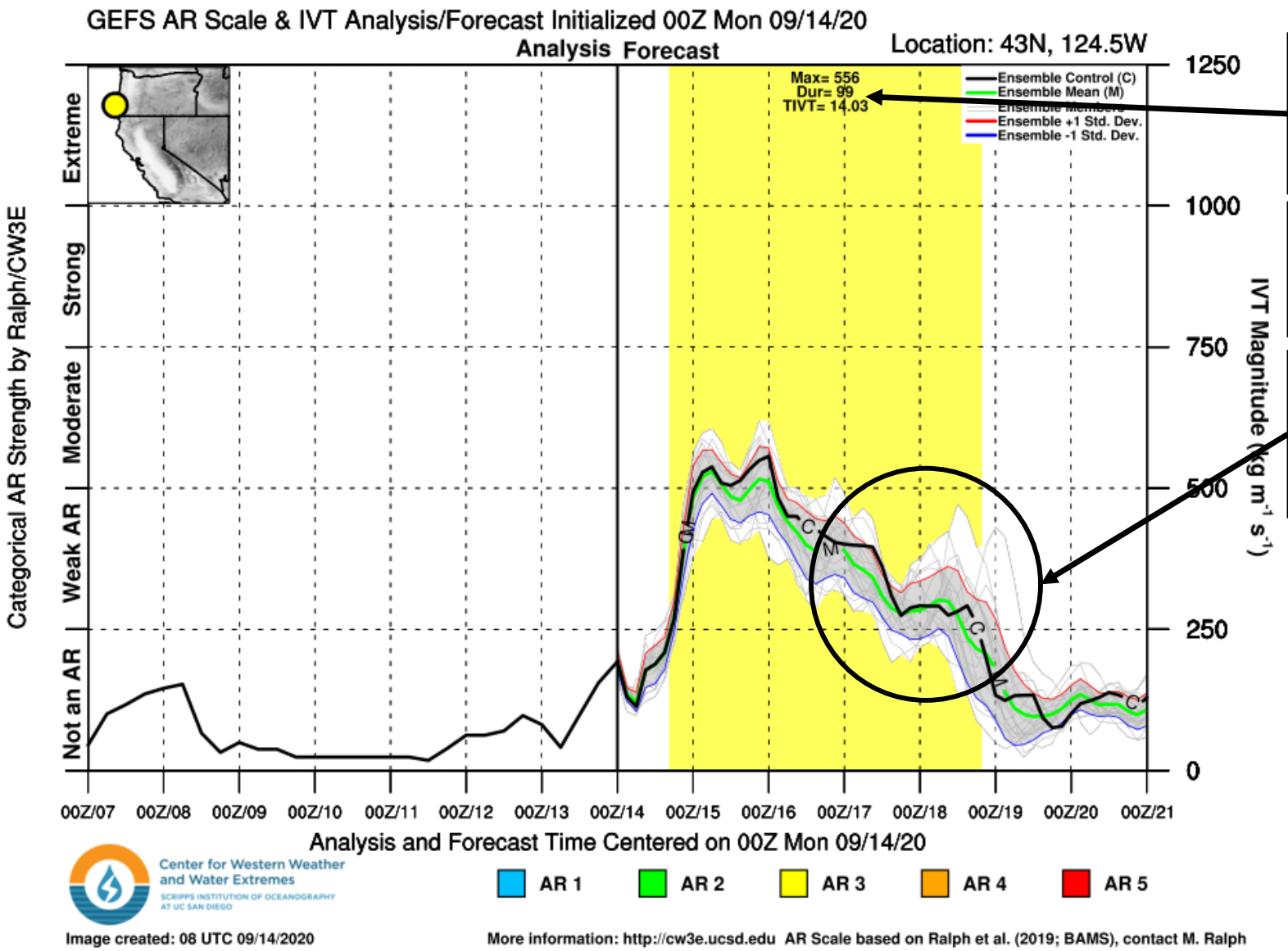
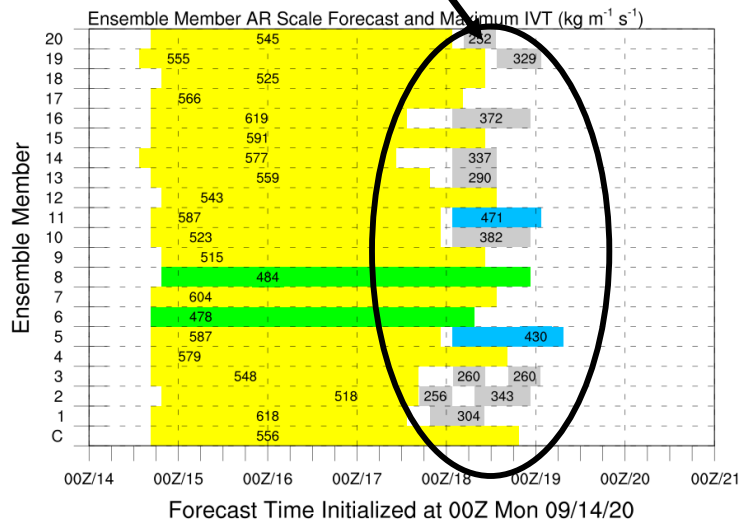


The GEFS control is currently forecasting a maximum IVT magnitude of ~556 kg m^{-1} s^{-1} and an AR condition duration of 99 hours over South-Coastal Oregon.

This combination of maximum IVT magnitude and AR duration result in an AR 3 on the AR Scale (Ralph et al. 2019).

As the event progresses, ensemble spread of IVT magnitude increases, resulting in large uncertainty in overall AR conditions duration and some uncertainty in AR Scale forecasts.



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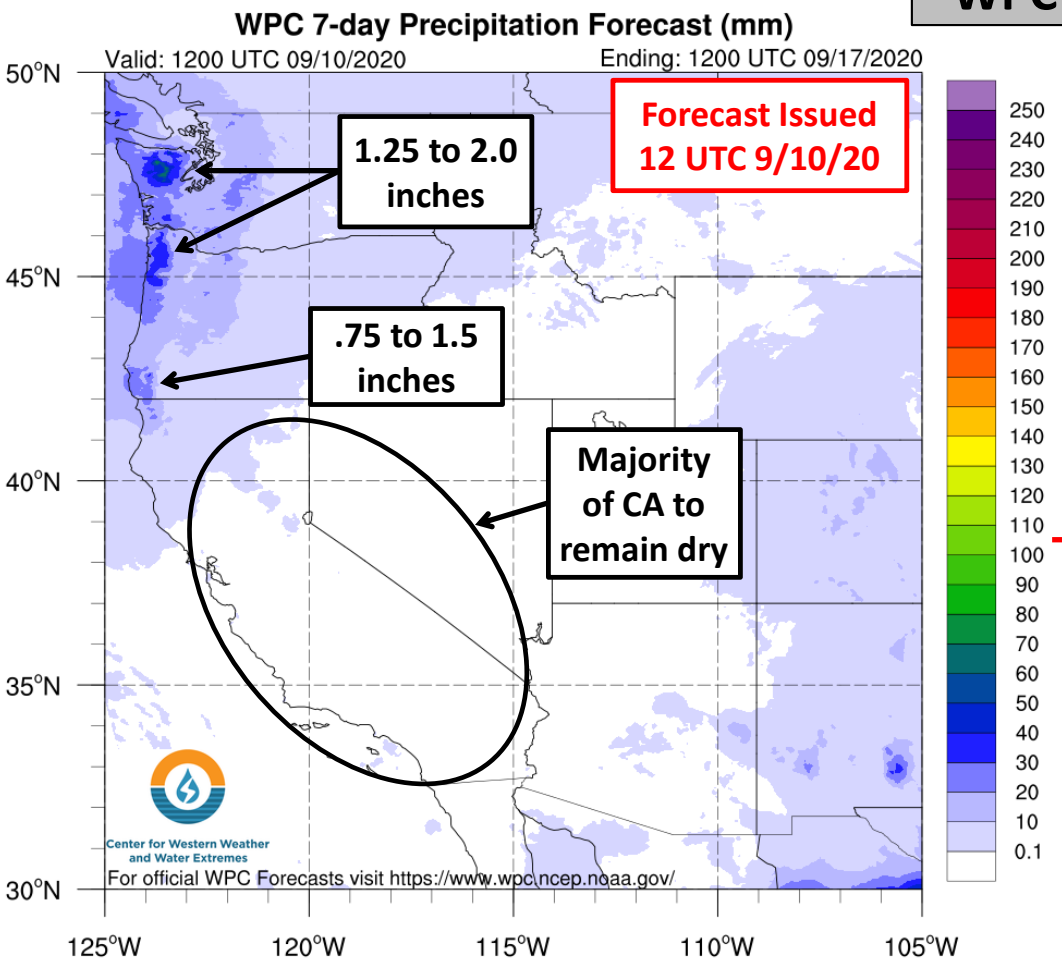
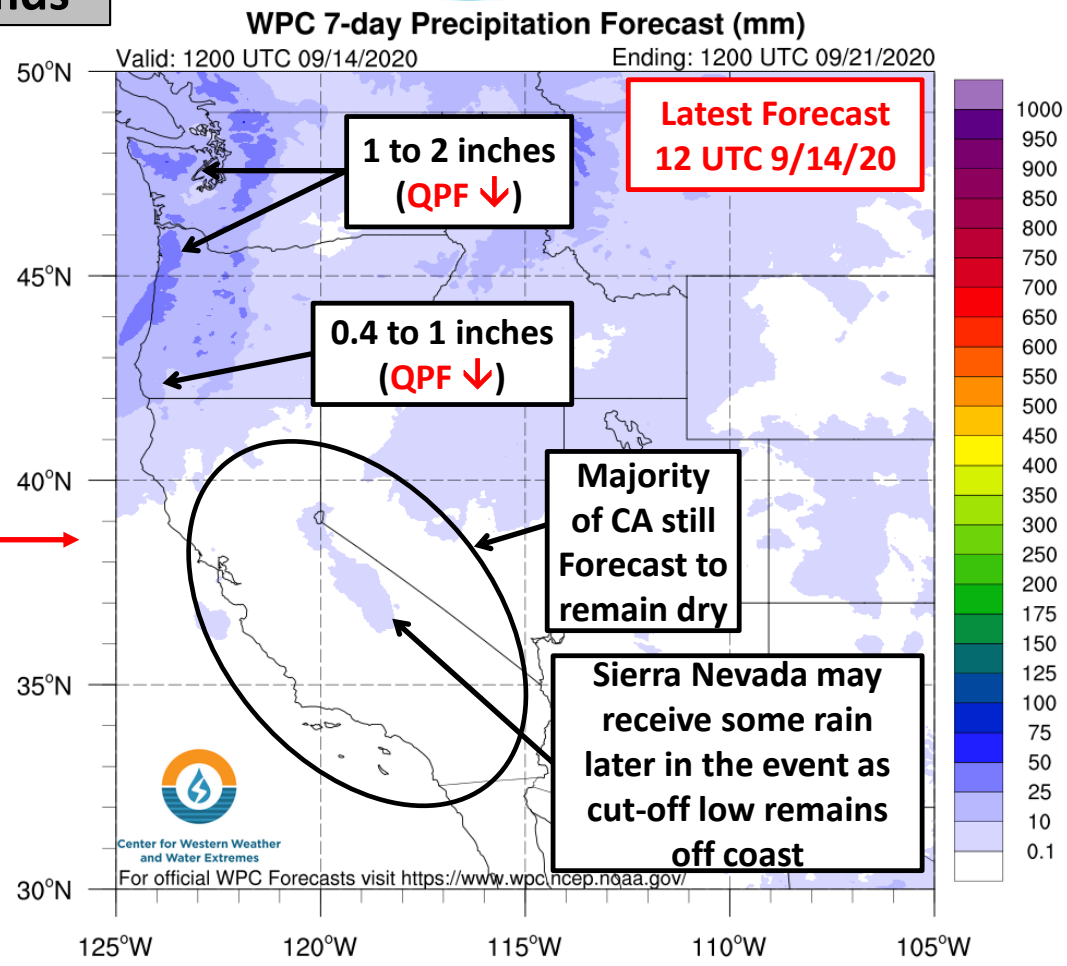
WPC QPF Forecast Trends



Forecast Trend
INIT. TIME



- When comparing the NOAA Weather Prediction Center's 7-day QPF initialized at 12 UTC 10 Sep. to the latest forecast (12 UTC 14 Sep.), the QPF in a majority of locations has trended towards lower precipitation accumulations.
- The only locations that saw a potential increase in forecast precipitation are the Cascade Mountains in OR and WA and the Sierra Nevada in Central CA (precipitation is forecast to still be light).
- The forecast continues to suggest that this AR will primarily impact the Pacific Northwest and only bring light precipitation to far N. CA.

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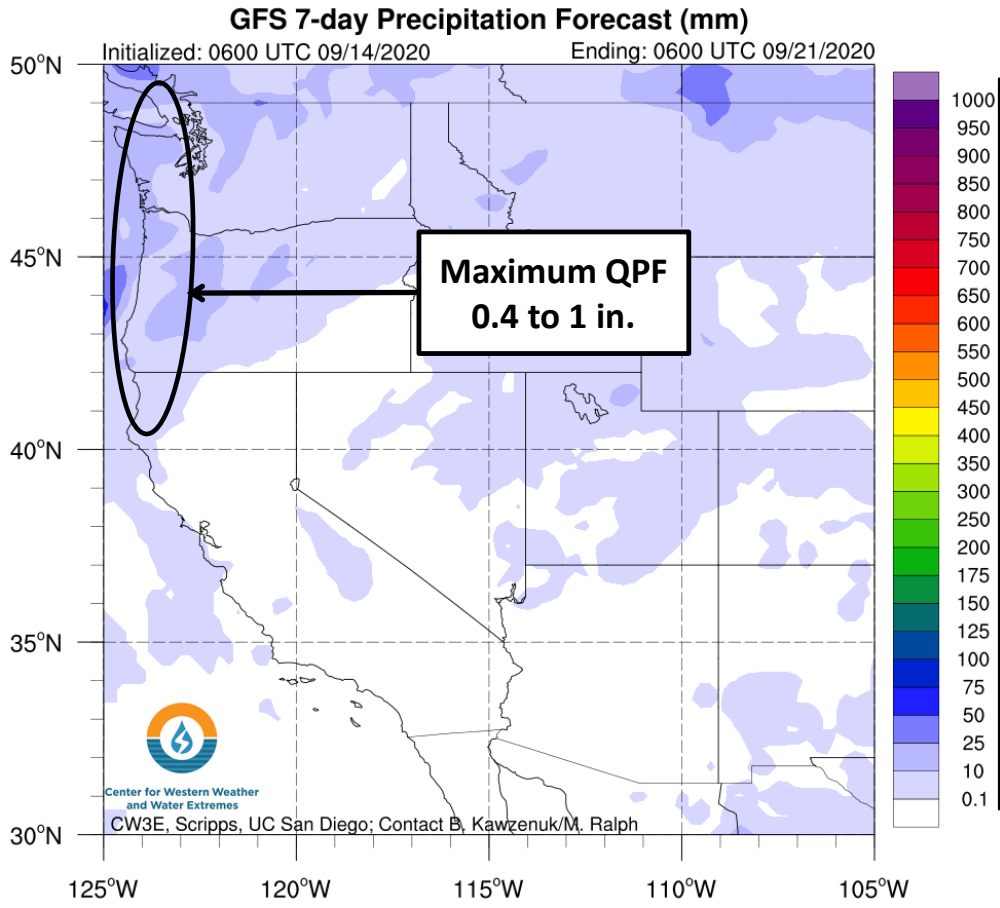
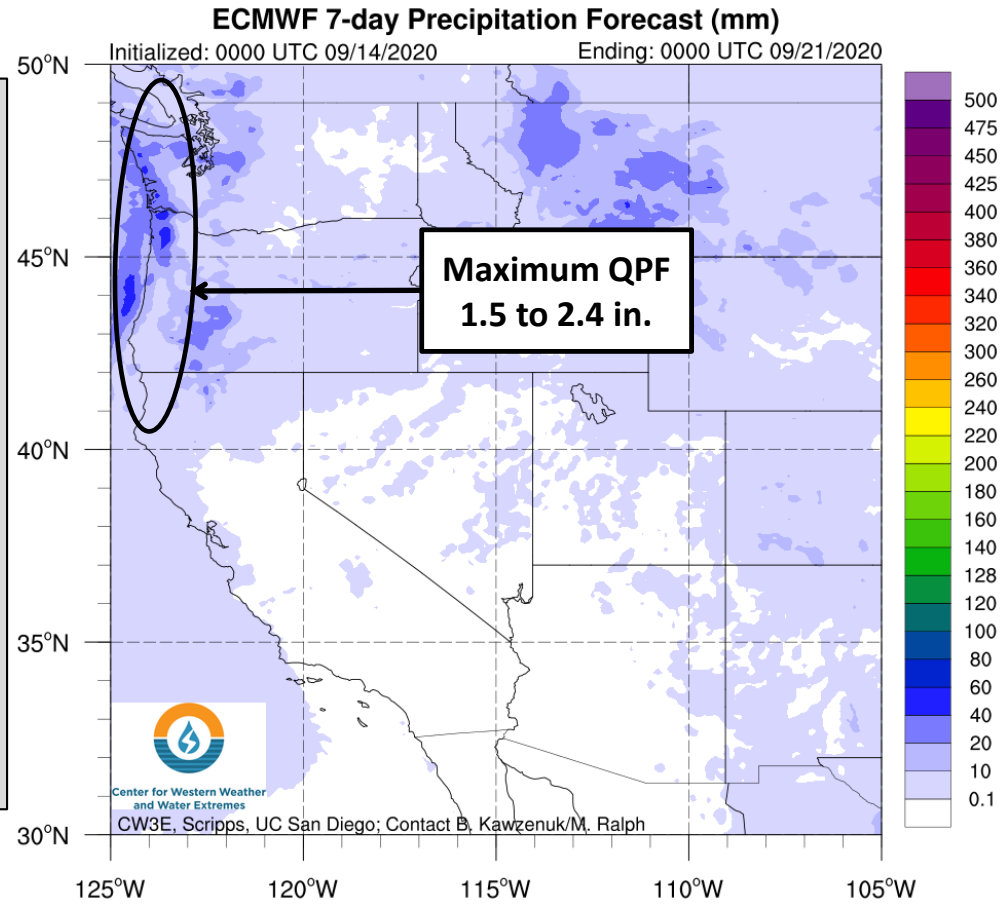
GFS and ECMWF 7-Day Quantitative Precipitation Forecasts



- There is also large model-to-model uncertainty when comparing the GFS and ECMWF 7-day QPF.
- The ECMWF model has trended towards a larger precipitation event across coastal Washington and Oregon
- While the ECMWF is more confident that precipitation will extend further south, accumulations are forecast to be light (<0.5 inches)



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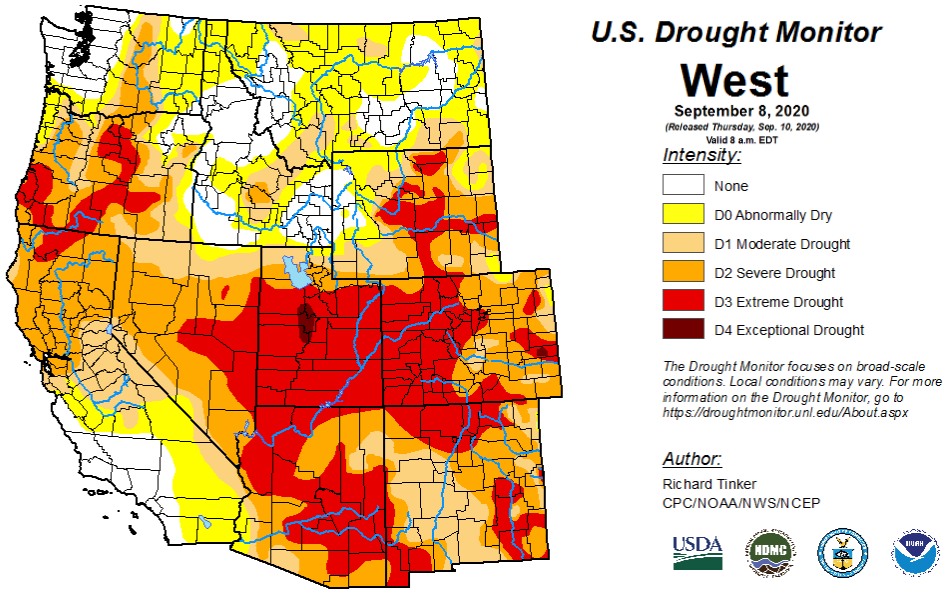
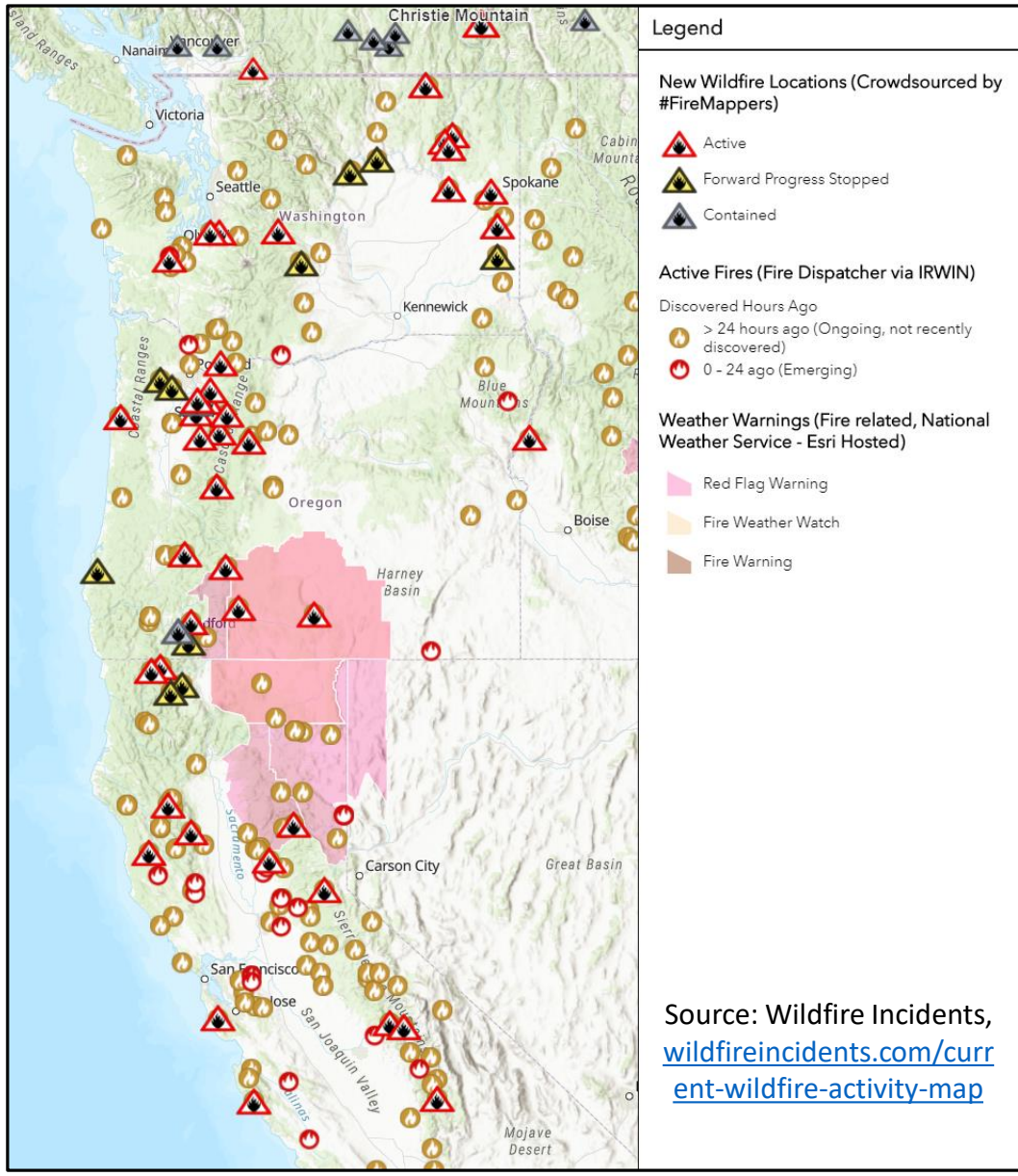
As mentioned in the previous outlook, there are numerous wildland fires burning across the Western U.S.

Large Fires Currently Burning

- **California: 25**
- **Oregon: 13**
- **Washington: 15**

While current precipitation forecast are not suggesting large precipitation accumulations compared to some of the stronger winter-time ARs, any precipitation over the Pacific Northwest and Northern California could bring some alleviation to the numerous active fires and severe to extreme drought conditions across the region





Source: Wildfire Incidents, wildfireincidents.com/current-wildfire-activity-map